

Nidec
All for dreams

LARGE PRECISION MACHINE

MVR·Fx SERIES



NIDEC MACHINE TOOL CORPORATION

www.nidec.com/en/nidec-machinetool/

"ZERO" Target

ZERO step, ZERO form error and ZERO hand finishing

We thought through compatibility of high accuracy and high quality surface.
This is achieved thorough removal of heat, vibration and misregistration.



NOTE: The photo includes optional equipment.

MVR-Fx achieves a high quality surface without any surface steps and increases productivity by reducing the need for hand finishing.

MVR-Fx reproduces die-mold shapes precisely and reduces the number of trial parts, which leads to shorten delivery time and reduction of man-hours.

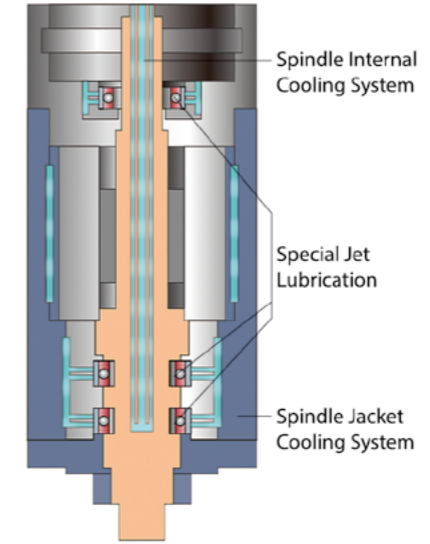
LARGE PRECISION MACHINE

MVR • **Fx** SERIES



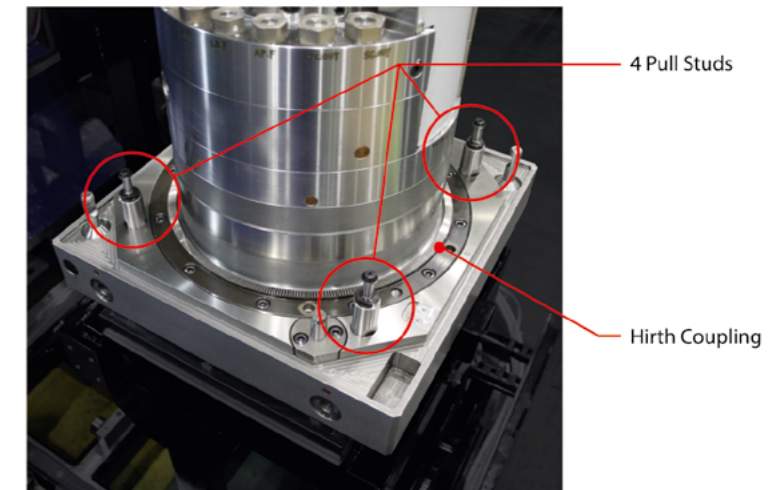
Spindle Internal Cooling

Cooling both spindle center and spindle jacket prevents spindle thermal displacement due to heat during spindle rotation. Special Jet Lubrication cools bearings and minimizes temperature differences. This increases preload of the bearings and achieves high spindle rigidity. Tool growth is reduced due to spindle and is effective in Die-Mold machining.

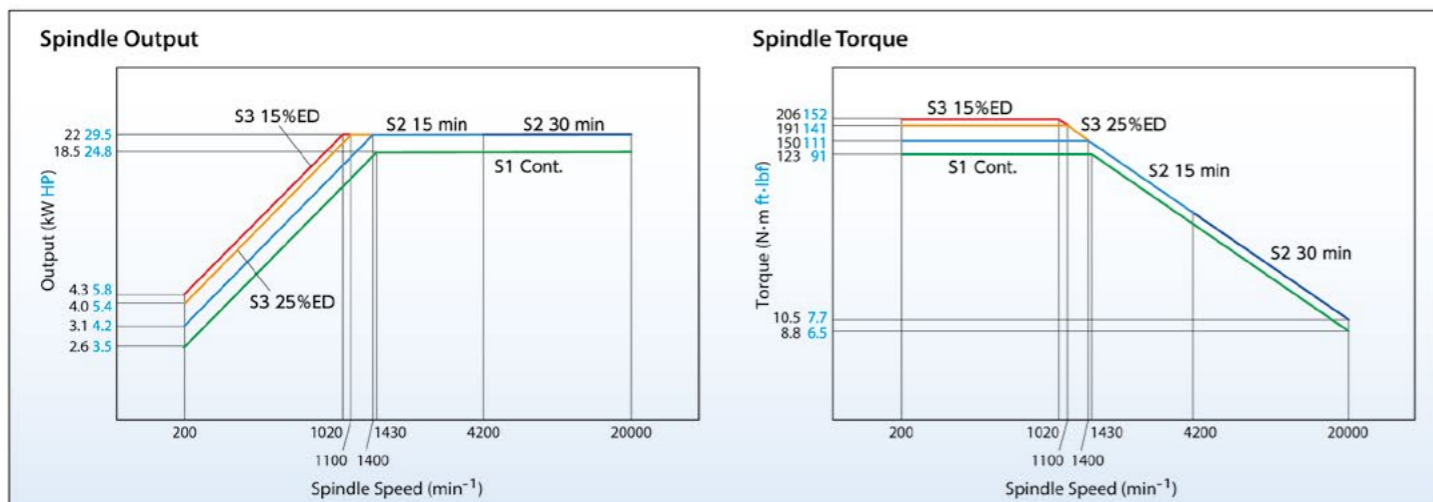


Attachment

Attachment type Spindle is excellent for maintainability. Attachment is integrated to Ram with large diameter hirth coupling and 4 pull studs for rigidity.



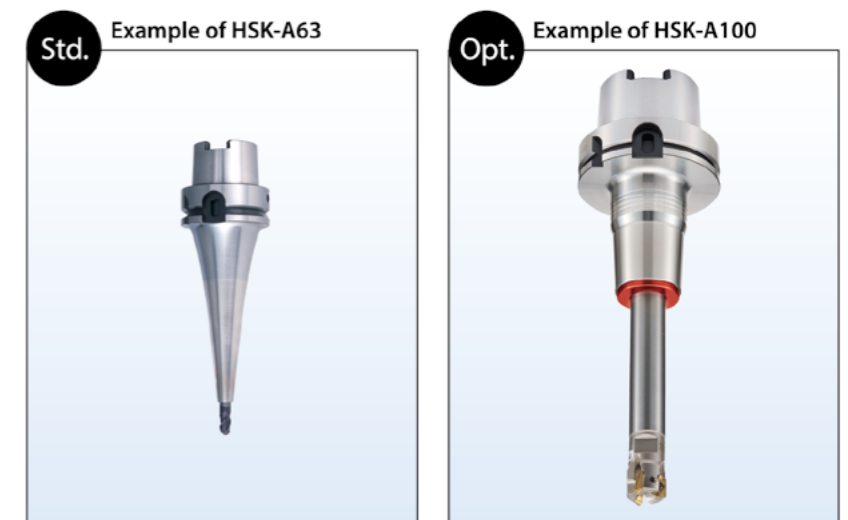
Spindle Output & Torque *Std. Extension head (20,000 min⁻¹)



Adoption of HSK Spindle

Standard HSK Spindle has good adhesion property in the tapered portion during high speed operation. *Dihedral constraint system contacts both the end face of flange and the hollow taper shank making the elastic deformation.

Both Standard HSK-63A Spindle Extension Head and Optional Torque increased type HSK-100A Spindle Extension Head can be used separately by a single machine. (Both HSK-A63 tool and HSK-A100 tool can be changed by ATC)



1 High Rigidity Large Crossrail

Crossrail has a wide cross-section to prevent deformation by saddle movement.

1 High Rigid Double Column without overhang

Overhang is eliminated to remove vibration during machining.

2 3 Rows of Linear Guides

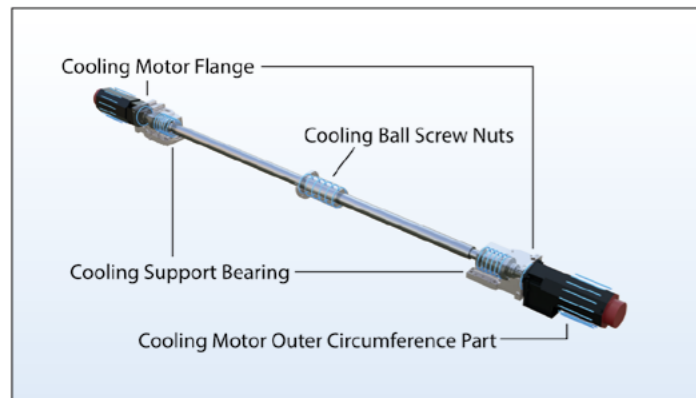
An additional linear guide is placed in the center section of the table to prevent table deflection when a workpiece is placed on it.

2 X-axis Twin Ball Screw

X-axis drive is highly rigid with twin ball screws to move heavy workpieces and restrain table from yawing.

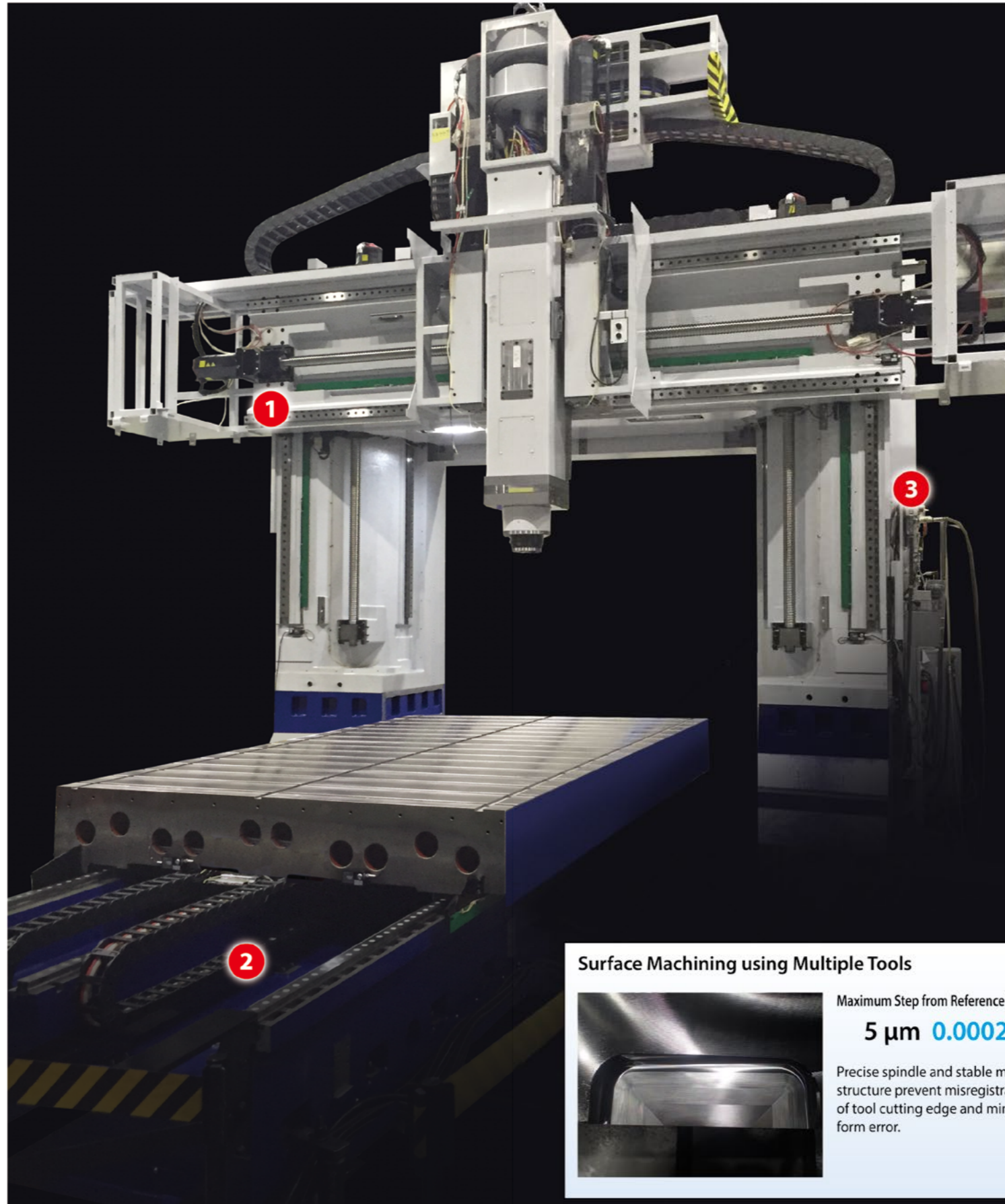
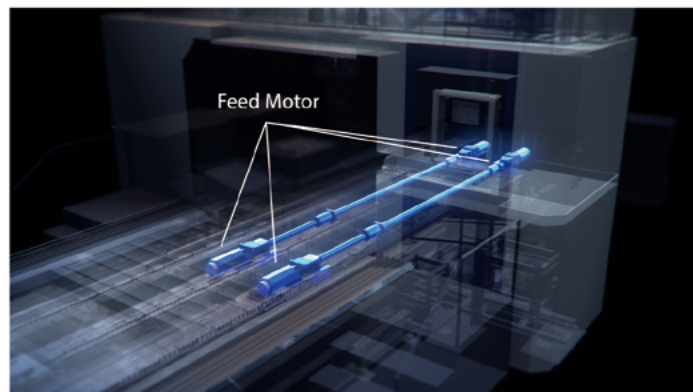
Cooling Ball Screw

Deformation of ball screws is reduced by cooling the motors, support bearings and ball screw nuts, eliminating any heat generation.



Zero Gap Drive System

Servomotors are directly connected to both ends of ball screws. "Zero Gap Drive System" prevents the loss of motion accuracy from backlash and minimizes the wobble in machining path.



3 High Rigidity Symmetrical Structure

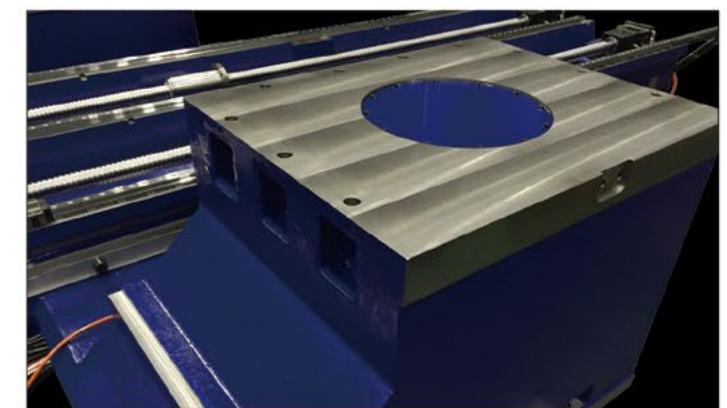
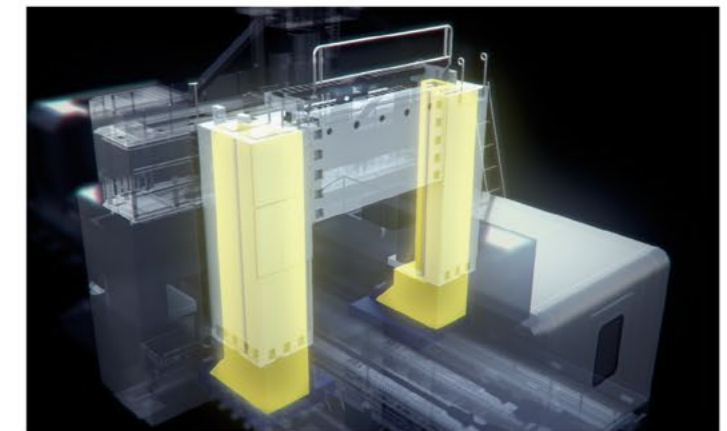
Symmetrical structure is applied to prevent deformation of main machine.

3 Thermally Stabilized Column

Thermally stabilized column is standard, reducing the affect of temperature change.

3 Wide Columns

Wide columns with 4 rows of linear guides placed on the front side and inside on the double columns support force at acceleration and deceleration and cutting reaction force rigidity.



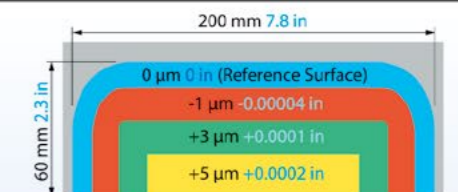
Surface Machining using Multiple Tools



Maximum Step from Reference Surface

5 μm 0.0002 in

Precise spindle and stable machine structure prevent misregistration of tool cutting edge and minimize form error.



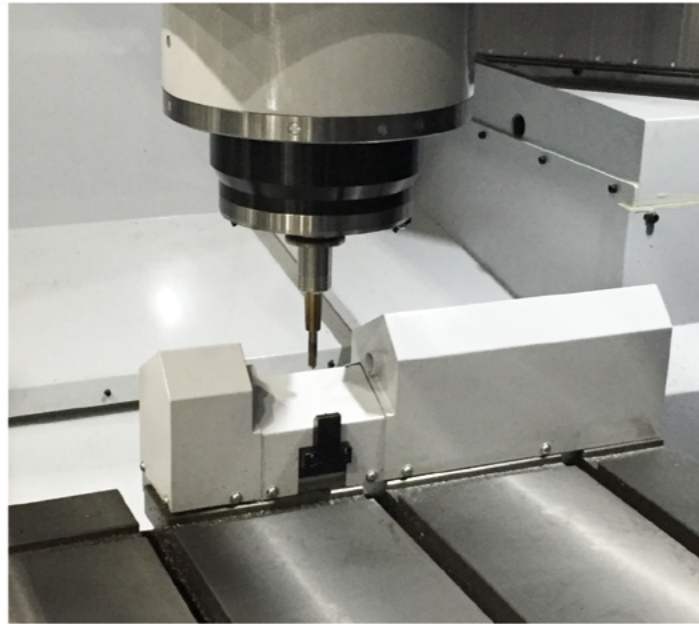
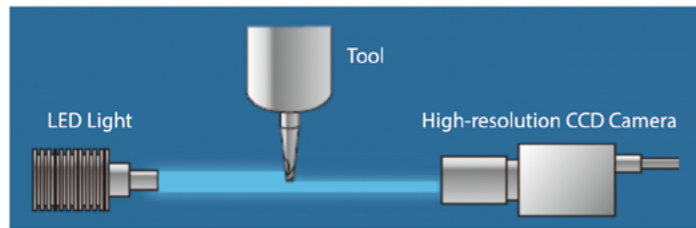
Part	Method	Tool	Pick Feed	Spindle Speed	Feed Rate
Blue	Counter Line Machining	φ12 R0.5 Radius EM	8.0 mm 0.3 in	2,650 min ⁻¹	580 mm/min 22.8 ipm
Red	Contour Machining	R3 Ball EM	0.15 mm 0.006 in	2,000 min ⁻¹	2,000 mm/min 78.7 ipm
Green	Contour Machining	R5 Ball EM	0.2 mm 0.008 in	10,000 min ⁻¹	1,000 mm/min 39.4 ipm
Yellow	Contour Machining	R8 Ball EM	0.25 mm 0.010 in	6,000 min ⁻¹	600 mm/min 23.6 ipm

Measured values in this brochure are provided as an example. The result indicated in this brochure might not be achieved due to differences in cutting conditions as well as environmental conditions during measurement.

Opt. Optical Image Type Automatic Tool Measurement System

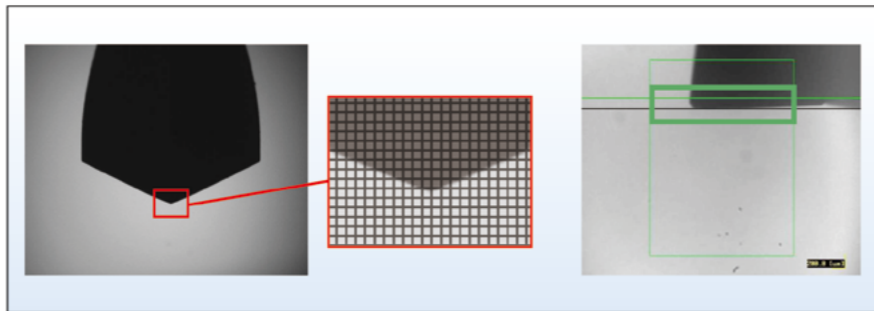
Non-contact measurement system

At first, the rotating tool approaches the view area of the high-resolution CCD camera. The camera captures a silhouette of the tool with LED light and records the contour accurately without making contact. This system measures the detected cutting edge continuously and can keep checking the behavior of lowest point of the tool in real time. Also it determines independently if the machine, holder and tool are thermally stable and performs tool length correction automatically.



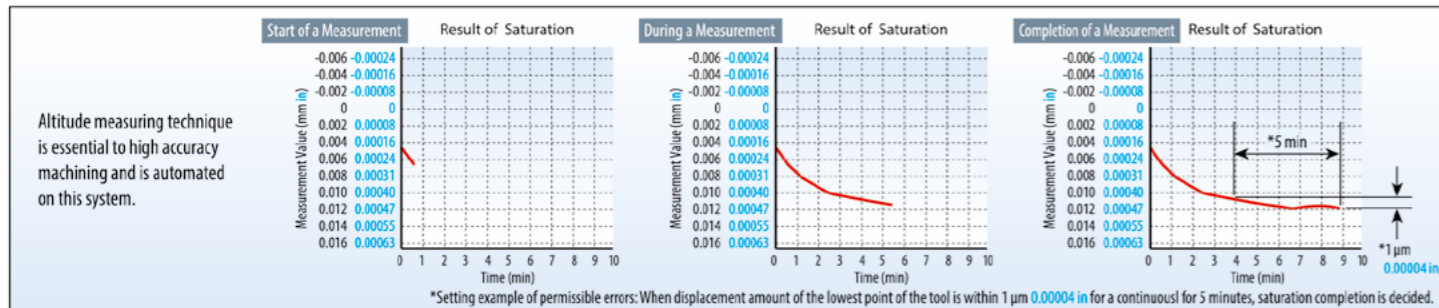
Digital image scan detection

Unique high speed digital processing technique detects the lowest point of tool from the image captured by combination of a high-performance large-aperture lens and high density image element. Altitude filtering, arithmetic and optimization of measuring range overcome unnecessary information that affects the measurement accuracy.



Automatic saturation determination function

This system has unique logic to determine automatically stability of the machine and tool with continuously keeping a record of position information of the detected cutting edge.



Optical Image Type Automatic Tool Measurement System Specification

Item	Specification
Measurement Item	Tool Length, Tool Diameter, Tool Length Saturation Determination, Tool Length & Diameter Breakage Detection
Measuring Range (Length)	75 mm 3.0 in ~400 mm 15.7 in
Measuring Range (Diameter)	φ0.02 mm 0.0008 in ~φ100 mm 3.9 in
Permissible Tool Rotation Speed	100~20,000 min ⁻¹
View Area	8.47 mm 0.33 in x7.1 mm 0.28 in
Display Resolution	0.1 μm 0.000003 in
Additional Air Consumption	150 NL/min

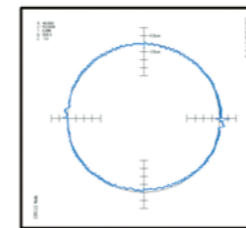
20,000 min⁻¹ Spindle

Stabilized 20,000 min⁻¹ Spindle enables use of CBN tooling, allowing longer life. Also precise tool path of the MVR-Fx prevents unforeseeable loads on the tool and contributes further to long tool life. Extension of tool life contributes to shortening of machining time and increases precision.

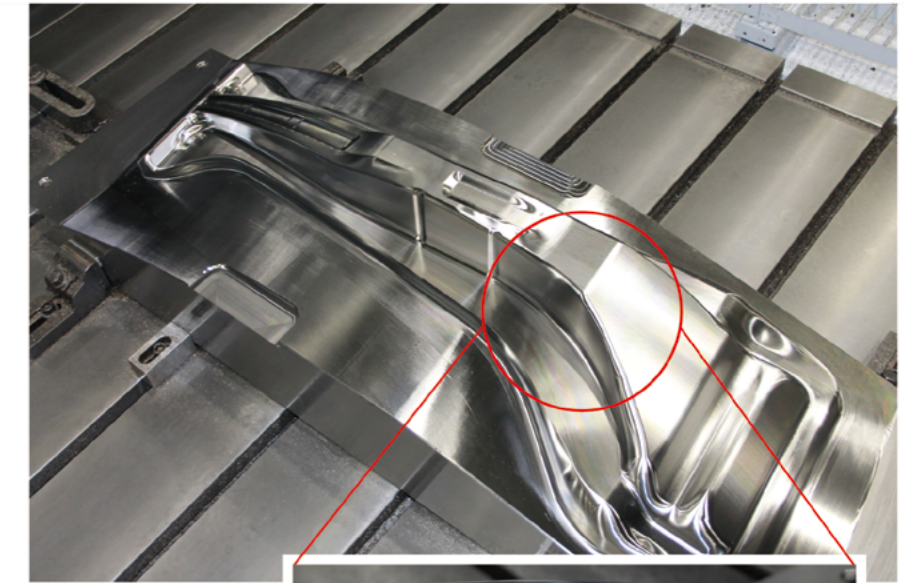
HGP3 Control*

HGP3 is the high-speed and high-precision machining processing software used to achieve a high quality machining surface. It reflects the machining program to surface faithfully.

*HGP: High Gain Processor



Measured Roundness : 1.7 μm 0.00007 in



Model of Automobile Center Pillar Mold
Material: Molding alloy industrial tool steel



High quality machining surface reducing unnecessary or unwanted hand finishing

Magnifying Image

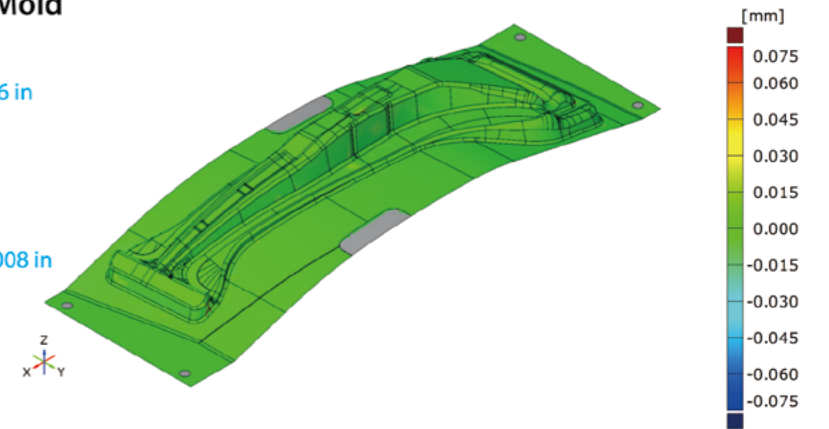
Example Model of Automobile Center Pillar Mold

Machining surface quality

Tool feeding direction: Surface roughness Ra 0.15 μm 0.000006 in
Pick direction: Surface roughness Ra 0.22 μm 0.000009 in
No fluctuation and no visible quadrant projection

Result of 3-D measurement

Form error between design and machined model ±20 μm 0.0008 in



Opt. Non-contact optical three-dimensional digitizer

The combination with ATOS enables 3-D free-form surface conventionally difficult by touch sensor produces effects like the following.

- To eliminate wasted time spent for air cutting with the shortest approach by measurement of material form before machining.
- To eliminate the number of trial operations and hand finishing man-hours because of clarification of points that should be revised by measurement of work after machining.
- To enable mass production immediately by MVR-Fx that can be reproduced by creating original data with measurement of the final die-mold after trial and revision.



Machines are designed with our "Factory Friendly Concept", to be operator and environmentally friendly.

- Electric opening/closing full enclosure for safety and work environment.
- Equipment layout allowing inspections and repair work for improving maintainability



Equipment Panel

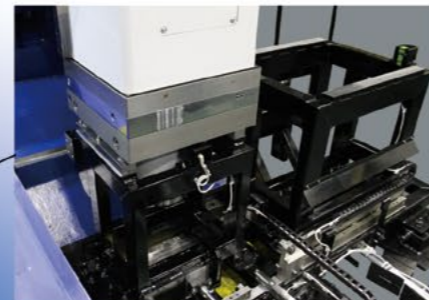
Operator Panel

- 15" touch screen, thin and light panel
- USB input/output
- Full key board, Hard switches



Operator Panel is movable and can come near the table for set-up.

- Both-side approach structure to ensure the workability for set-up and measurement
- Auto Tool Changer (ATC) and Auto Attachment Changer (AAC) incorporated inside of the cover

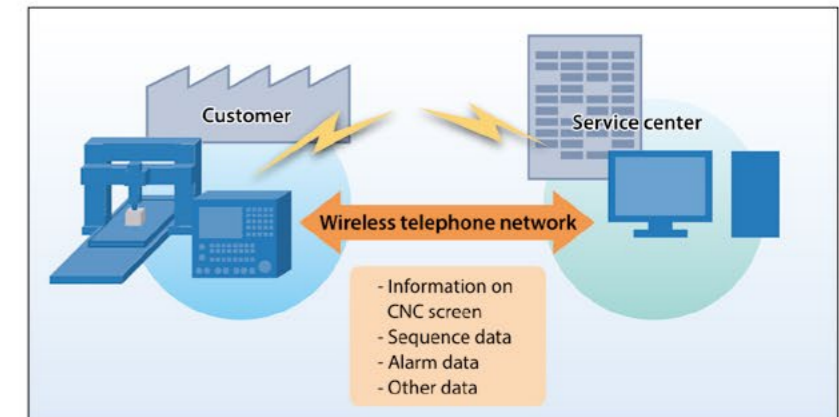


Auto Attachment Changer(AAC)

Remote Monitoring Service System

Using wireless telephone network, our service center can directly monitor machine condition and support by finding the best way for machine recovery.

* In the case of continuing this service from two years after the installation, communication cost is paid by the customers.



Opt. Operation Monitoring System

This system enables the user to view the operation information by web screen, PC or mobile phone with real-time acquisition of various information including NC and accumulation in a cloud server.

The user can confirm the operating situation from a location separated from the machine while away.



Confirmation Screen of Operation Monitoring

Machine Specifications

Item		MVR30F _x	MVR35F _x
Distance between columns		2,550 100.4	3,050 120.1
Distance from table top to spindle nose		1,650 65.0 (Std.) 2,000 78.7 (Opt.)	
Table	Table work surface	Width	2,000 78.8
		Length	3,000 118.1
	Length	Std. mm in	4,000 157.5
		Opt. mm in	5,000 196.9
Loading capacity		20 44,000	25 55,100 (Std.) 30 66,100 (Opt.)
Axis travel	Table longitudinal (X axis)	Std. mm in	3,200 126.0
		Opt. mm in	4,200 165.4, 5,200 204.7
	Saddle crosswise (Y axis)	mm in	3,000 118.1
	Ram vertical (Z axis)	mm in	800 31.5
Crossrail vertical (W axis)		1,100 43.3*1 1,300 51.2*2	
Spindle	Ram size	mm in	□420 16.5
	Nose taper		HSK-A63
	Speed	min ⁻¹	20,000
	Motor output	kW HP	22 30/18.5 25 (30 min./Cont.)
ATC		40 (Std.) 60, 80, 100 (Opt.)	
Cutting feed		15 49 (Std.) 20 66 (Opt.)	
Rapid traverse	Table longitudinal (X axis)	m/min fpm	20 66
	Saddle crosswise (Y axis)	m/min fpm	20 66
	Ram vertical (Z axis)	m/min fpm	15 49
	Crossrail vertical (W axis)	m/min fpm	5 16
Total power consumption		100 (Std.) 110 (Opt. Extension head: 10,000 min ⁻¹ , HSK-A100)	
Machine weight / Table length		55,400 122,200/3,000 118.1	
		kg/mm lb/in	
		60,000 132,200/4,000 157.5	
		64,300 141,700/4,000 157.5	
		69,600 153,400/5,000 196.9	

*1 Distance from table top to spindle nose: 1,650 mm 65.0 in
*2 Distance from table top to spindle nose: 2,000 mm 78.7 in

Std.

Standard Equipment

- Ball screw cooling X, Y, Z axes
- Directly drive system of X, Y, Z axes
- Twin ball screws of X, Y axes
- MP scale back for all axes (X, Y, Z, W)
- Spindle internal cooling system
- Thermally stabilized column
- Extension head (20,000 min⁻¹)
- Automatic tool changer (ATC) with tool magazine(50 tools is Std.)
- Full enclosure
- Indication lamp
- Work light (LED)
- Chip chute on both side of the table

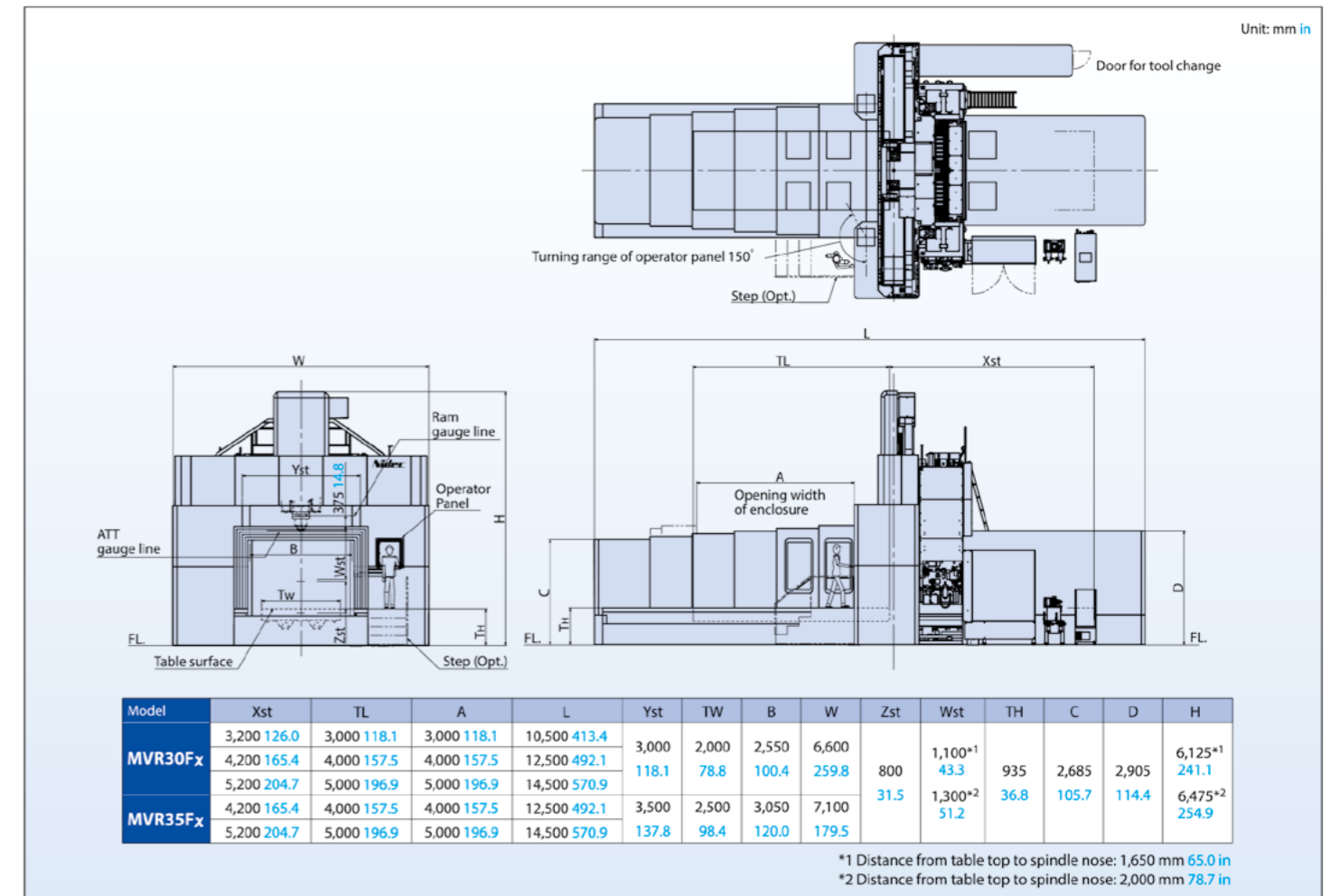
- Operator friendly function
 - ① Recovery function
 - ② Diagnosis function
 - ③ Periodic check function
 - ④ Centering function
 - ⑤ Maintenance service function
 - ⑥ Alarm display function
 - ⑦ System construction
- Tool management function
- Earth leakage breaker
- HGP3 Control
- Remote monitoring support service

Opt.

Optional Equipment

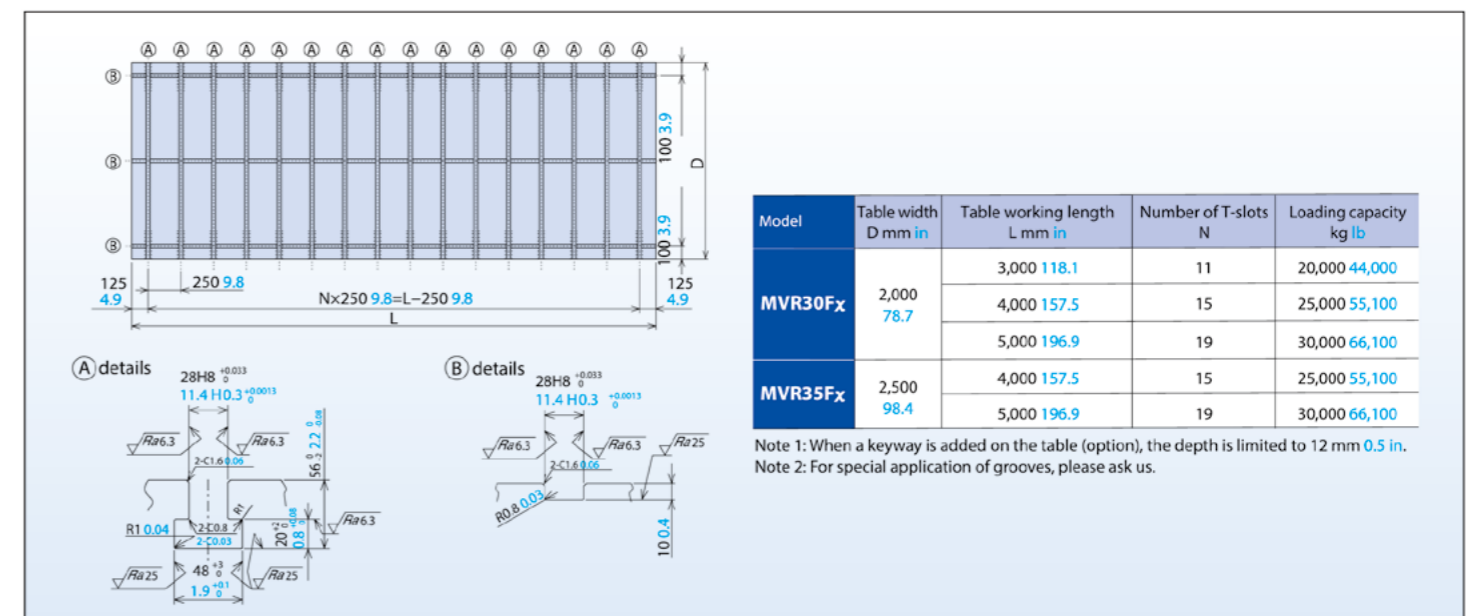
- ☑ Contact-type automatic tool length measurement system
- ☑ Optical image type automatic tool measurement system
- ☑ Hinged steel belt chio conveyor: Orthogonal to table longitudinal direction
- ☑ Hinged steel belt chio conveyor: Parallel to table longitudinal direction
- ☑ Upgrade of Cutting feed to 20 m/min 787.4 ipm
- ☑ Colum riser block 350 mm 13.8 in and Upgrade of W-axis travel to 1,300 mm 51.2 in
- ☑ Upgrade of tool magazine storage capacity of Automatic Tool Changer(ATC)
 - 60 □ 80 □ 100
- ☑ Flood coolant supply system: Water-Soluble, 0.5MPa 71 psi, 20L 5.3 gal/min, with Coolant temperature control device
- ☑ Coolant supply system through the spindle
- ☑ Extension head (10,000 min⁻¹) HSK-A100
- ☑ Universal head (20,000 min⁻¹) HSK-A63
- ☑ Automatic attachment changer for Extension head or Universal head
- ☑ Operation monitoring system

Machine Dimensions



*1 Distance from table top to spindle nose: 1,650 mm 65.0 in
*2 Distance from table top to spindle nose: 2,000 mm 78.7 in

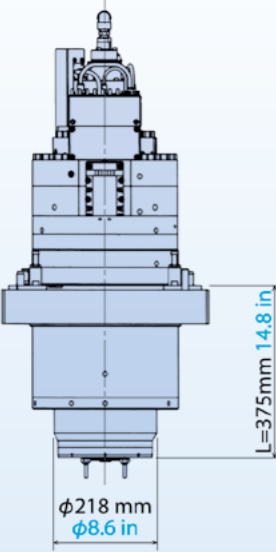
Table Surface



For detailed specifications, refer to the NC operation manual.

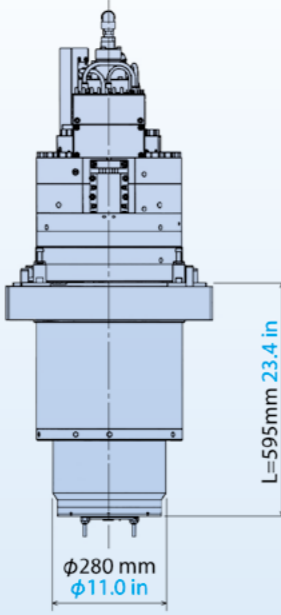
Attachment Specification

Std. High Speed Type Extension Head



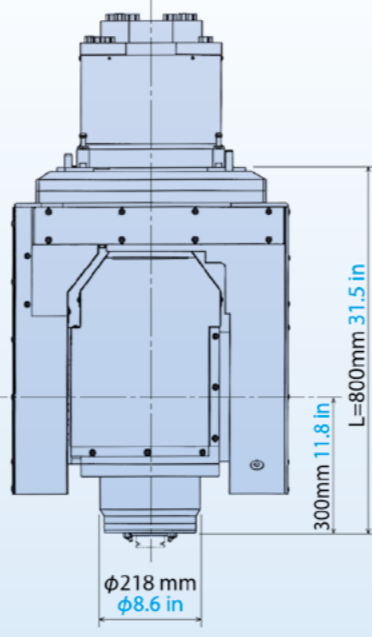
Spindle speed: 200–20,000 min⁻¹
Output: 22/18.5 kW 30/25 HP (15 min/Cont.)
HSK-A63

Opt. Torque Up Type Extension Head



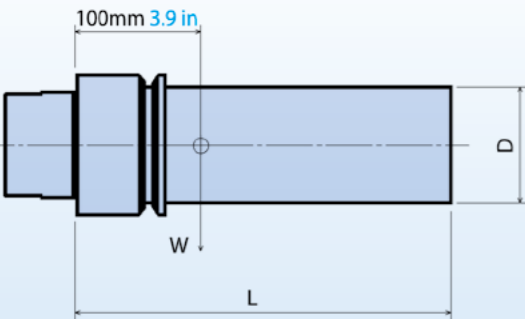
Spindle speed: 100–10,000 min⁻¹
Output: 22/15 kW 30/20 HP (30 min/Cont.)
HSK-A100

Opt. High Speed Type Universal Head



Spindle speed: 200–20,000 min⁻¹
Output: 18.5/11 kW 25/15 HP (10 min/Cont.)
Indexing (Horizontal): ±180° (every 1°)
Indexing (Vertical): 0~90° (every 1°)
HSK-A63

Maximum Tool Size



Model	L (mm in)	D (mm in)	W (kg lb)
HSK-A63	300 11.8	125 4.9	8 17
HSK-A100	400 15.7	125 4.9	12 26

Std. Standard Functions

Item	Description
Controlled axis	
Stored stroke check 1	
Stroke limit check before move	
Mirror image	X, Y axes
Operation	
Program/Sequence number search	
Sequence number comparison stop	
Program restart	
Jog feed	0~4,000 mm/min. 157.5 ipm (22 step)
Manual reference position return	
Manual handle feed	Portable type manual handle (x1, x10, x100, x1000)
3-dimensional handle feed	Tool direction + normal direction
Manual handle interruption	One dimensional
Interpolation functions	
Single direction positioning	G60
Exact stop mode/Exact stop	G61/G09
Dwell	G04 (Dwell in second)
Helical interpolation	G02, G03 Circular interpolation+max. 2 axis linear interpolation
Reference position return/check	G28/G27
2nd reference position return	G30 (P2)
3rd/4th reference position return	G30 (P3, P4)
Tapping mode/Cutting mode	G63/G64
Feed function	
Feed per minute	G94, mm/min. ipm
Tangential speed constant control	
Cutting feedrate clamp	
Automatic acceleration/deceleration	Rapid traverse: linear, Cutting feed: linear+exponential
Override cancel	M17: Enable, M18: Disable
Program input	
Optional block skip	Total 3
Decimal point programming	Pocket calculator type decimal point programming
Input unit 10 time multiply	0.01 mm, 0.001deg, 0.0001 inch
Plane selection	G17, G18, G19
Coordination system setting	
Automatic coordination system setting	
Workpiece coordinate system	G54~G59, 6 pairs
Workpiece coordinate system preset	G92.1
Manual absolute on and off	
Optional chamfering/corner R	
Programmable data input	G10
Sub program call	M98 (10 toolds nested)
Custom macro	G65, G66, G66.1 (5 toolds nested)
Coordinate system rotation	G68, G69
3-dimensional coordinate conversion	G68, G69 (this function is required for 5-face machining software/universal head software)
Addition of custom macro common variables	600 (total), #100~#199, #500~#999 (This function is required for 5-face machining software)
Canned cycles	G73, G74, G76, G80~G89
Circular interpolation by R programming	12-digit
Auxiliary/Spindle speed function	
2nd Auxiliary function	B3-digit, For attachment index
Spindle speed function	S4-digit, binary output
Tool function/Tool compensation	
Tool offset pairs	±7-digit 200
Tool offset memory C	Distinction between geometry and wear, or between cutter and tool length compensation
Tool length compensation	G43, G44, G49
Cutter dia. compensation C	
Tool management system	T8-digit
Automatic tool length measurement	
Editing operation	
Part program storage capacity	256 Kbyte (640 m 2,100 ft)
Program editing	Number of registerable program number 500
Background editing	
Program protect	
Setting and display	
Status/Clock/Cutting position display	
Program display	Program name 31 characters
Self diagnosis function	Self diagnosis in NC system
Alarm display/Alarm history display	
Graphic function	

Item	Description
Actual cutting federate display	
Multi-language display	English version/Japanese version
Data protection function	1 type
Erase CRT screen display	
Data input/output	
Memory card input / output	Program, NC data
USB memory input / output	Program, NC data
Embedded ethernet interface	100 base-T(1ch)
Data server	ATA FLASH CARD I/F: 100 base-T (1ch)
High speed machining function	
HGP3 (High Gain Processor)	Smooth interpolation (Machining of successive minute straight lines)
Others	
CRT character display	15" color LCD

Opt. Optional Functions

Item	Description
Controlled axis	
Inch/metric conversion	G20, G21
Stored stroke check 2, 3	
Operation	
Tool retract and recover	
Interpolation functions	
Conical/spiral interpolation	G02, G03
Polar coordinate interpolation	G12.1, G13.1
Threading, synchronous cutting	G33
High speed skip	This function is required for automatic workpiece measurement/ Tool breakage monitor/Automatic tool length measurement
Multi step skip	G31 (P1~P4), This function is required for Tool breakage/ Auto tool length measurement
Feed function	
One-digit F code feed	
Feed stop	
Program input	
Polar coordinate command	G15, G16
Addition of workpiece coordinate system pair	G54.1, 48 pairs, 300 pairs
Interruption type custom macro	
Automatic corner override	G62
Scaling	G50, G51
Programmable mirror image	G50.1, G51.1
Figure copy	G72.1, G72.2
Retrace (Reverse)	Cannot select this function if Interruption type custom macro is selected.
Program format for FS15	
Auxiliary/Spindle speed function	
Rigid tapping	Including 3-dimensional rigid tapping
Tool function/Tool compensation	
Tool offset pairs	±7-digit 400, 499, 999, 2,000
Tool offset	G45, G46, G47, G48
3-dimensional cutter compensation	G40, G41
Tool life management	240, 1,000 pairs (Tool management system version)
Editing operation	
Part program storage capacity	512 Kbyte (1,280 m 4,200 ft), 1 Mbyte (2,560 m 8,400 ft), 2 Mbyte (5,120 m 16,800 ft), 4 Mbyte (10,240 m 33,600 ft), 8 Mbyte (20,480 m 67,200 ft)
Number of registerable program	Number of program: 1,000 (512 Kbyte), 2,000 (1 Mbyte), 4,000 (2 Mbyte)
Extending the number of memory card program registerable	Number of program: 500 or 1,000
Play back	
Machining time stamp	
Setting and display	
Run hour and parts count display	This function is required for operation time accumulation.
Dynamic graphic display	This function include "Background display"
Data input/output	
Reader/puncher interface	RS232C×1ch (Program in/out or Auto. measuring data printout)
Reader/puncher interface expansion of receiving buffer	Remote buffer interface
Data server	ATA FLASH CARD I/F: 100 base-T (1ch)
Program transfer tool	Application software for PC



Inquiry

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Phone: +1-248-669-6136 Facsimile: +1-248-669-0614
<https://www.nidec-machinetoolamerica.com>

NIDEC DRIVE TECHNOLOGY DE MEXICO, S. de R.L. de C.V.
Parque Industrial NAVEX PARK, Callejón de la Evangelización #106,
Cal. Santa Maria Magdalena, Querétaro, Qro. 76137, México
Phone: +52-442-242-3351

Nidec-Shimpo do Brazil Imp., Exp. e Com. de Equip. Ltda.
Estrada General Motors, 852 – Galpão 11 &12, Indaiatuba - SP
13347-500 Brazil
Phone: +55-11-5071-0015

Nidec-Shimpo GmbH
Ludwigstrasse 9, 80539 Munich, Germany
Phone: +49-89-125030-780 Facsimile: +49-89-125030-781

Manufacturing bases

Federal Broach & Machine Company, LLC
1961 Sullivan Drive, Harrison, MI 48625 U.S.A.
Phone: +1-989-539-7420 Facsimile: +1-989-539-7381
<https://federalbroach.com/>

Southeast Broach Company - South Carolina LLC
431 S Buncombe Rd Greer, SC 29650 U.S.A.
Phone: +1-864-879-7641 Facsimile: +1-864-879-7693
<https://www.sebroach.com/index-2.html>

Nidec India Precision Tools Ltd.
No.2 SIPCOT Industrial Complex, Ranipet, Tamil Nadu, India
Phone: +91-4172-244361

Nidec Machine Tool (Changshu) Corporation
181 Huangpujiang Road,
Changshu New & Hi-tech Industrial Development Zone,
Changshu City, Jiangsu Province 215500, P.R. China
Phone: +86-512-5230-3030



Machine specifications such as dimensions etc., are fixed using SI units including the metric system.
In case data are shown in other units in blue, such as inches, pounds and gallons etc. they are for reference only and the formal data
in black supersedes any equivalent data given in blue when fractions caused by conversion become an issue.
Specifications are subject to change without prior notice.
The export of this product is subject to Japanese Governmental approval.